REMARKS/ARGUMENTS

Claims 1-11 remain pending in the application. Applicant, by this paper, amends claims 1 and 11 and requests reconsideration and allowance of all pending claims.

Discussion of Amendments to the Drawings

FIG. 8 is amended to remove a spurious line in the drawing. A marked up version of FIG. 8 along with a substitute sheet is attached herewith.

Discussion of Amendments to the Specification

Paragraphs [0006] and [0015] are amended to align the language in the paragraphs with the language of amended claims 1 and 11.

Discussion of Rejections Under 35 U.S.C. §103

1. In regards to Office Action:

Claims 1-2 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 5,793,621 to Yamada et al. (hereinafter the '621 reference) in view of U.S. Patent No. 6,714,425 to Yamada et al. (hereinafter the '425 reference). Claims 3-11 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over the '621 reference in light of the '421 reference and further in view of U.S. Patent Application Publication No. 2002/0145888 to Yoshinga et al. (hereinafter Yoshinga).

2. In response to the Office Action:

The applicant has amended claims 1 and 11, the independent claims of the present application, so that the feature of the invention is clarified. Claim 11 corresponds to claim 1 as a method claim based on the same technical thought as claim 1.

3. Description of the Present Invention:

A feature of the present invention is, as presented in amended claim 1, that a drive control voltage supply section (8) applies a drive control voltage necessary for generating drive signal to said drive control section (6) to activate the drive control section. That is, the drive control voltage is supplied to the drive control section as the source voltage. The activated drive control section generates a drive signal in accordance with a signal that indicates magnitude of

the output voltage. The drive control section then supplies the generated drive signal to the voltage generating section (2, 3, 4) to control and drive it. Supplied with the drive signal, the voltage generating section (2, 3, 4) generates an output voltage to be supplied to the load.

At a light load, where the output current output by the power supply is less than a preset current value, the drive control voltage supply section (8) stops applying the drive control voltage to the drive control section (8) to stop it. This stops generation of a voltage given to a load.

After lapse of a predetermined time since stopping of the drive control section, the drive control voltage supply section (8) again applies the drive control voltage to the drive control section (6). This reactivates the drive control section (6) and the voltage generating section (2, 3, 4).

Therefore, the power supply of the present invention requires no externally-supplied activation signal for being activated after having been previously stopped in response to a light load.

When the drive control section (6) and voltage generating section (2, 3, 4) are activated again, if the load is light, the drive control voltage supply section (8) once stops applying the drive control voltage to the drive control section (6), so that the drive control section (6) and the voltage generating section (2, 3, 4) are stopped and the generation of voltage for the supply to the load is stopped. Therefore, the drive control section (6) and voltage generating section (2, 3, 4) are intermittently operated if the load is continuously light so that the electrical power consumption is minimized. If the load is heavy, the drive control section (6) operates continuously, and operates voltage generating section (2, 3, 4) so that it drives continuously.

4. The reasons for which the claim is inventive:

The Examiner alleges that claim 1 is obvious for those in the art applying the technique of '425 reference to'621 reference.

Then, we compare claim 1 as amended with the disclosure of the '621 reference and the '425 reference.

4. 1. Comparing claim 1 of the present invention with the technique of '621 reference, indeed, the load circuit (load circuit) 23 in '621 reference corresponds to a load of claim 1 as amended; the switch control pulse forming circuit 65 of '621 reference corresponds to the drive control section of claim 1 as amended; and the dc to dc converter circuit of '621 reference corresponds to the voltage generating section of claim 1.

However, the '621 reference and claim 1 of the present application are different from each other in the following points—

(1) The invention of claim 1 as amended is designed to provide low electrical power consumption by changing the state of driving the voltage generation section in accordance with the magnitude of the output current being supplied to the load. That is, the state of driving the voltage generating section is changed depending on the heaviness of the load. On the other hand, the invention of '621 reference is designed to reduce a switching loss by changing the state of driving dc to dc converter circuit 6, in accord with the frequency of a horizontal synchronizing pulse. Therefore, the present invention and '621 reference have respective different objectives.

(2) The invention of claim 1 as amended stops the operation of the voltage generating section when the output current is small. On the other hand, the invention of '621 reference merely changes switching frequency of FET 8 provided in the dc to dc converter circuit 6. The invention described in the '621 reference does not stops the dc to dc converter circuit 6. Therefore, the invention described in the '621 reference cannot sufficiently cut off the electrical power consumption.

(3) Claim 1 as amended of the present application is configured so that it once stops driving the voltage generating section when the output current is small, while driving the voltage generating section again after lapse of predetermined time. On the other hand, the description in the '621 reference fails to describe changing the state of driving the dc to dc converter circuit 6 unless the frequency of the horizontal synchronizing pulse is changed Therefore, the operation of the present invention is different from that of '621 reference.

(4) The invention of claim 1 as amended activates the drive control section by applying the drive control voltage, while stopping the drive control section by

stopping the application of the drive control voltage. Therefore, the power supply of claim 1 can cut off not only the electric power consumption of the voltage generating section, but also of the electric power consumption of the drive control section. On the other hand, the invention of '621 reference does not stop applying the voltage to the switch control pulse forming circuit 65, which generates a signal to be supplied to the switch driver circuit 66. Accordingly, the invention of '621 reference cannot suppress the electric power consumption in the switch control pulse forming circuit 65.

4.2. Comparing claim 1 as amended of the present application with '425 reference, a circuit comprising a power factor improving converter and a DC-DC converter of '425 reference corresponds to the voltage generating section of claim 1. The power factor improving converter (PFC controller)113 and DC/DC controller 112 of '425 reference correspond to the drive control section of claim 1. Then, the power factor improving converter 126 is stopped when the load is light. In this respect, '425 reference is similar to claim 1 of the present application.

However, claim 1 as amended of the present application is different from '425 reference in the following points.

(1) In claim 1, the state of load is detected from the output current. On the other hand, the load state judgment circuit 25 of '425 reference judges the state of the load based on a pulse signal VG that is for switching on and off a switching element 8. This pulse signal VG is a signal whose pulse duration is limited so that the output voltage of dc to dc converter circuit 127 is constant. That is, the claimed invention and '425 reference are different from each other in their method for detecting the state of load.

(2) The load state judgment circuit 25 of '425 reference judges the state of load based on the pulse signal VG that switches on and off the switching element 8. Therefore, it needs a first reference period generator 22b, a second reference period generator 22c, and an on period comparison circuit 21, and PFCON/OFF switching circuit 24, etc. The number of parts increases and the structure of the apparatus becomes complex. The structure of the apparatus of claim 1 is simple.

(3) According to claim 1, the drive control voltage supply section stops the drive control section when the load is light, and stops driving the voltage generating section. On the other hand, the apparatus of '425 reference stops *only the power factor improving converter controller* (PFC controller)113. DC/DC controller 112 in the dc to dc converter circuit 127 operates continuously. Therefore, the invention of '425 reference cannot sufficiently reduce the electrical power consumption.

(4) According to claim 1, the drive control voltage supply section stops applying the drive control voltage to the drive control section, so that the source voltage of the drive control section is cut off and the drive control section and voltage generating section are stopped. On the other hand, the apparatus of '425 reference does not cut off the power of the power factor improving converter controller 113, but stops the power factor improving converter controller 113 based on the bias current I bias3 provided from the PFC ON/OFF switching circuit 24 to the power factor improving converter controller 113. Therefore, the operation of the present invention is different from that of '425 reference.

(5) According to claim 1 as amended, the drive control section can be activated after once the drive control section is stopped, without need of any externally provided activation signal. On the other hand, in '425 reference, the bias current I bias3 serves as an activation signal. After the stop of the power factor improving converter controller 113, the power factor improving converter controller 113 cannot be activated unless the bias current I bias3 is changed. Therefore, the apparatus of '425 reference requires an on period comparison circuit 21and PFC ON/OFF switching circuit 24 besides the output voltage detector19, which makes the apparatus be more complex.

4.3. Accordingly, '621 reference and '425 reference are completely different from the present invention in structure and in effect. Even if a power supply that stops FET8 of '621 reference is considered in accordance with the indication given by the Examiner, it, unlike the present invention, cannot be a simple-structured, sufficiently low power consumption apparatus. Further, it is not so easy to think of the structure of the present invention, which provides such a particularly significant working effect, from the apparatus that stops FET8 of

'621 reference. Therefore, the present invention is not obvious over the descriptions of '621 and '425 references. Applicant respectfully requests reconsideration and allowance of claim 1.

Claims 3-10 depend, either directly or indirectly from claim 1 and are believed to be allowable at least for the reason that they depend from an allowable base claim. The Yoshinga reference fails to cure the deficiencies in the '621 and '425 references, alone or in combination. In particular, Yoshinga fails to teach or suggest the ability to stop generating a voltage in the presence of a light load and then restarting the voltage output in the absence of any external input. Applicant respectfully requests reconsideration and allowance of claims 2-10.

Claim 11 includes features similar to those discussed above in relation to claim 1 and is believed to be allowable at least for the reasons provided above in relation to claim 1.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6100.

Respectfully submitted,

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